

PATENTDocket No.: FR000003
Customer No. 000024737**Amendment to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (currently amended) An image processing method for providing three-dimensional geometric modeling of the spine, using a biplanar image reconstruction, comprising:

acquiring a first digital view (F) of a part of the spine;

acquiring a second digital view (L) of the same part of the spine taken from a different angle around the longitudinal axis of the spine, wherein each of the first and second digital views of the spine include a spine ribbon having a non-zero width and being substantially symmetrical with respect to a virtual axial line along an axis of vertebrae bodies of the spine in respective first and second digital views;

drawing ~~an~~ a real axial line (FAL, LAL) for each of the first and second digital views coinciding with a the virtual axial line of the corresponding spine ribbon in a respective one of the first and second digital views, the real axial line being represented by a continuous line and wherein drawing the real axial line includes an operator using a control means of to control a drawing program, and wherein to digitally draw each real axial line (FAL, LAL) corresponds to as a piece-wise linear curve drawn from a start point to an end point along an estimate of the virtual axial line of the corresponding spine ribbon;

matching the dimensions of the digital views (F, L) from two predetermined corresponding landmarks (P1, P2) on each digital view set by the operator using the control means, wherein matching includes estimating a scale factor and a translation factor to make a system of coordinates for each digital view coincide, to provide a unique system of coordinates for the first and second digital views;

performing a spline calculation to provide a smoothed axial line (FAC, LAC) on each digital view, the spline calculation including mathematical modeling of the operator

PATENTDocket No.: FR000003
Customer No. 000024737

drawn piece-wise linear curves of the first and second digital views for supplying respective new digital smoothed curves, the new digital smoothed curves being constructed with interpolated values provided between points of the respective piece-wise linear curves; and

deriving three-dimensional coordinates (z, x, y) of corresponding points (P) along the spine as a function of the smoothed axial lines (FAC, LAC).

2. (currently amended) The image processing method as claimed in Claim 1, wherein, ~~for matching the two views, an axial line (FAL, LAL) is drawn on the spine on each view, and~~ the two landmarks (P1, P2) are set on said the real axial line on each digital view.

3. (currently amended) The image processing method as claimed in claim 2, wherein the matching of the dimensions of the two digital views is performed by a calculating matching coordinates $\{(x_{F1}, z_{F1}), (y_{L1}, z_{L1}), (x_{F2}, z_{F2}), (y_{L2}, z_{L2})\}$ for the two corresponding landmarks (P1, P2).

4. (currently amended) The image processing method as claimed in Claim 3, wherein a common system of coordinates (Z, X, Y) is determined for the two digital views, from the matched coordinates of the two corresponding landmarks.

5. (cancelled)

6. (previously presented) The image processing method as claimed in Claim 2, wherein three-dimensional coordinates (z, x, y) of corresponding points along the spine are determined for points (P) regularly spaced along the axis of coordinates (Z) corresponding to the longitudinal axis of the spine.

PATENT

Docket No.: FR000003
Customer No. 000024737

7. (currently amended) The image processing method as claimed in Claim 2, wherein the common system of coordinates is an orthogonal system, the first digital view is a frontal view (F), the second digital view is a lateral view (L) orthogonal to the frontal view, with a common axis (Z) in the direction of the longitudinal axis of the spine, a second axis (X) parallel to the frontal plane of view and the third axis (Y) parallel to the lateral plane of view.

8. (currently amended) An imaging system having acquisition means for acquiring a first and a second digital view of the spine, having display means to display the two digital views of the spine, having drawing means to draw real axial lines of the spine and to set predetermined corresponding landmarks on each digital view and having processing means to calculate three-dimensional coordinates of points along the spine according to the method as claimed in Claim 1.

9. (previously presented) The imaging system as claimed in Claim 8, wherein the processing means comprise a suitably programmed computer of at least one selected from the group consisting of a workstation and a special purpose processor having circuit means, which are arranged to process image data according to the method as claimed in Claim 1, and wherein the display means display images processed according to said method, further comprising means to store the image data.

10. (previously presented) An X-ray examination apparatus having a system as claimed in Claim 8.

11. (previously presented) A computer program product comprising a set of instructions for carrying out the method as claimed in Claim 1.